



15216 - Characterizing the Supernova Remnant Population of the Fireworks Galaxy, NGC 6946

Cycle: 25, Proposal Category: GO
(Availability Mode: SUPPORTED)

INVESTIGATORS

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VISITS

<i>Visit</i>	<i>Targets used in Visit</i>	<i>Configurations used in Visit</i>	<i>Orbits Used</i>	<i>Last Orbit Planner Run</i>	<i>OP Current with Visit?</i>
01	(1) NGC6946-UVIS1 ANY	ACS/WFC WFC3/UVIS	3	19-Jul-2017 17:03:52.0	yes
02	(2) NGC6946-UVIS2 ANY	ACS/WFC WFC3/UVIS	3	19-Jul-2017 17:03:55.0	yes
03	(3) NGC6946-UVIS3 ANY	ACS/WFC WFC3/UVIS	3	19-Jul-2017 17:03:58.0	yes
04	(4) NGC6946-UVIS4 ANY	ACS/WFC WFC3/UVIS	3	19-Jul-2017 17:04:00.0	yes
05	(5) NGC6946-UVIS5 ANY	ACS/WFC WFC3/UVIS	3	19-Jul-2017 17:04:03.0	yes

<i>Visit</i>	<i>Targets used in Visit</i>	<i>Configurations used in Visit</i>	<i>Orbits Used</i>	<i>Last Orbit Planner Run</i>	<i>OP Current with Visit?</i>
06	(6) NGC6946-UVIS6 ANY	ACS/WFC WFC3/UVIS	3	19-Jul-2017 17:04:06.0	yes
07	(7) NGC6946-UVIS7 ANY	ACS/WFC WFC3/UVIS	3	19-Jul-2017 17:04:08.0	yes
09	(8) NGC6946-ACS8 ANY	ACS/WFC WFC3/UVIS	4	19-Jul-2017 17:04:11.0	yes

25 Total Orbits Used

ABSTRACT

Characterizing large uniform samples of supernova remnants (SNRs) in spiral galaxies can lead to fundamental insights about the stellar cycle of life, death, and rebirth. We have underway a comprehensive multiwavelength (optical, near-IR, radio, X-ray) campaign using both imaging and spectroscopy to identify and characterize the rich SNR population in NGC 6946, which has produced more historical SNe than any other galaxy. Our catalog of ~200 candidates from ground-based imaging is missing key information about their size and morphology, since at the 5.9 Mpc distance, where 1" = 33 pc, all the smaller (younger) SNRs are unresolved. We request HST (WFC3 UVIS) imaging in H-alpha and [S II] 6716, 6731 of seven fields in NGC 6946, which will allow us to (a) measure sizes and morphologies of the ground-based SNR candidates, (b) identify small-diameter SNR candidates missed in the ground-based survey or located in confused regions, (c) search for optical traces from any of the 7 (out of 9) historical SNe within our survey region, and (d) search for any exceptional objects such as very young SNRs or micro-quasars that may be masquerading as normal SNR candidates. We also propose to use deep photometry and CMD-fitting on archival HST-ACS two-color broadband imagery of three fields, plus one additional ACS field proposed here, to determine the age of the stellar population surrounding many of the SNRs, and thus constrain the masses of their progenitor SNe. Finally, we will compare NGC 6946 with a similarly comprehensive analysis we have done for M83 to understand what characteristics might be galaxy dependent versus more universal.

OBSERVING DESCRIPTION

We request seven WFC3 UVIS fields in F657N (Halpha) and F673N ([S II]) to approximately cover the bright optical disk of NGC 6946 and also roughly duplicate the 9-field region observed previously with the WFC3 IR in Paschen beta (Prog. 14156, Leroy, PI) and in [Fe II] 1.64 um (Prog. 14638, Long, PI). We also request continuum imaging in a single filter, F547M, which avoids emission lines and will be used to scale and subtract from the narrow band emission images to remove galaxy background light and enhance the emission-line analysis. The continuum imagery requested

here only needs to go deep enough for this purpose, and can be kept reasonably short.

Our previous experience with HST observations of M83 and other galaxies allows us to have significant confidence in what will be seen for NGC 6946. Using our ground-based flux-calibrated imagery of both galaxies, the brightest SNRs in both galaxies have comparable fluxes of about $1\text{E-}14$ ergs/cm²/s, but the bulk of the SNR population identified so far in NGC 6946 is $\sim 2\text{x}$ fainter than for M83 ($\sim 5\text{E-}16$ instead of about $1\text{E-}15$). This is to be expected due to the greater distance and somewhat higher foreground extinction for NGC6946. Thus, we scale up the exposure times used for M83, and have determined a 3 orbit per field strategy (basically, one orbit in F657N, ~ 1.5 orbits in F673N, and ~ 0.5 orbit in F547M for continuum subtraction, assuming dithering by 3 exposures.

Existing data in NGC 6946 informs what we need for the additional field of ACS continuum imaging. Two orbits (each) of broadband B and R will match the existing data and provide the needed depth for the CMD fitting.

Parallels: NGC 6946 has an extended stellar halo beyond the bright disk. With a separation of ~ 6 arcmin between the WFC3 and ACS footprints in the HST focal plane, this makes the idea of parallel observing favorable. We therefore have included parallel imaging in R (F606W) and I (F814W) broadband filters (more appropriate than B and R for the outer halo) in our program. This includes ACS R and I parallels on the prime WFC3 exposures AND WFC3 R and I in parallel on the ACS prime observations. Depending on the specific orientation of the observations, some of these parallel fields may overlap existing parallel fields from earlier programs, thus driving the detection limits even fainter in those regions.

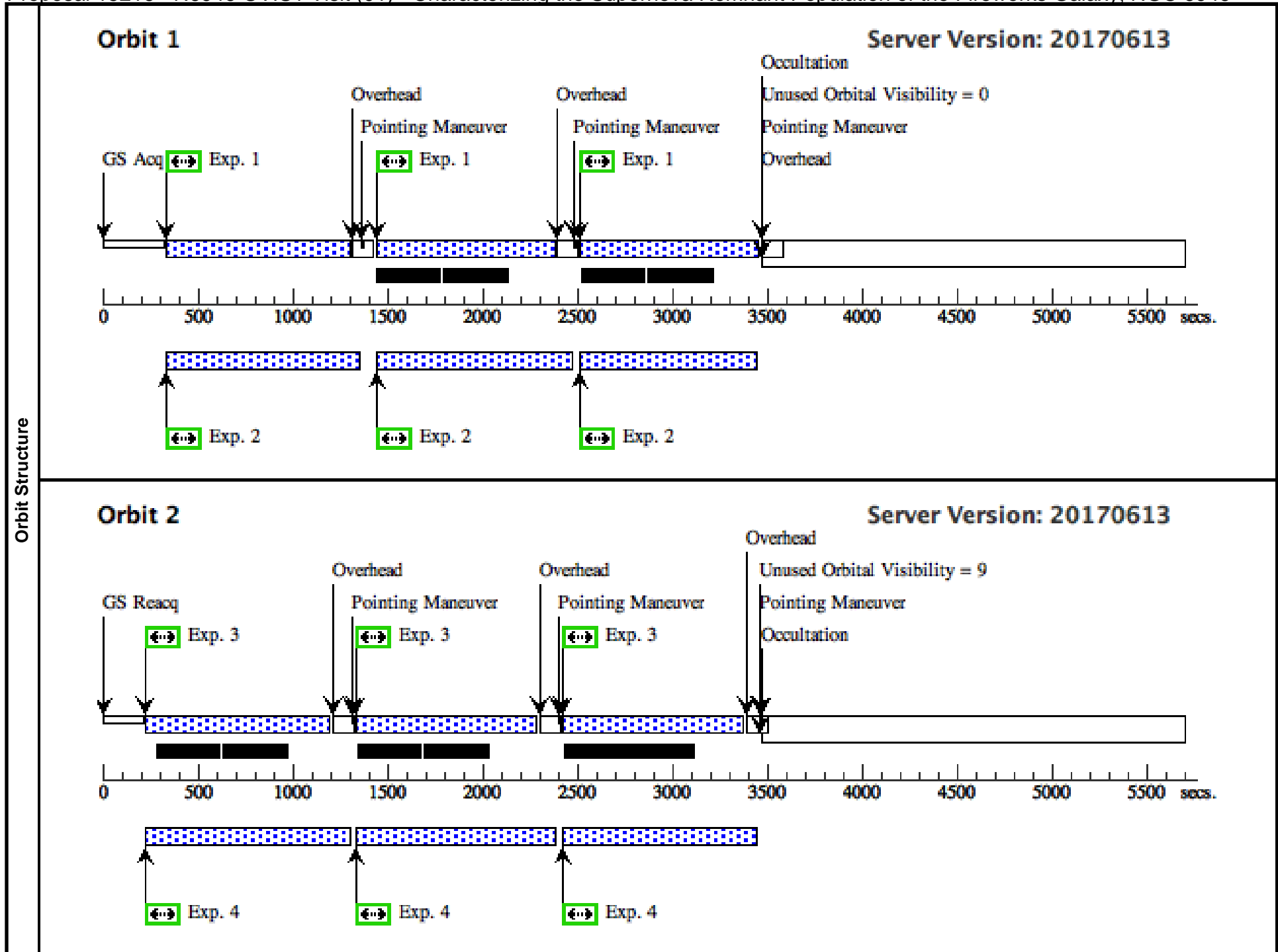
Proposal 15216 - N6946-UVIS1 Visit (01) - Characterizing the Supernova Remnant Population of the Fireworks Galaxy, NGC 6946

Wed Jul 19 21:04:13 GMT 2017

Visit	Proposal 15216, N6946-UVIS1 Visit (01)					
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	(3)	Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=1.605 Line Spacing=0.112	Coordinate Frame=POS-TARG Pattern Orientation=86.7 Angle Between Sides=81.6 Center Pattern=false		(3-4)	
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(1)	NGC6946-UVIS1	RA: 20 34 35.9400 (308.6497500d) Dec: +60 11 13.91 (60.18720d) Equinox: J2000		V=14	Reference Frame: ICRS

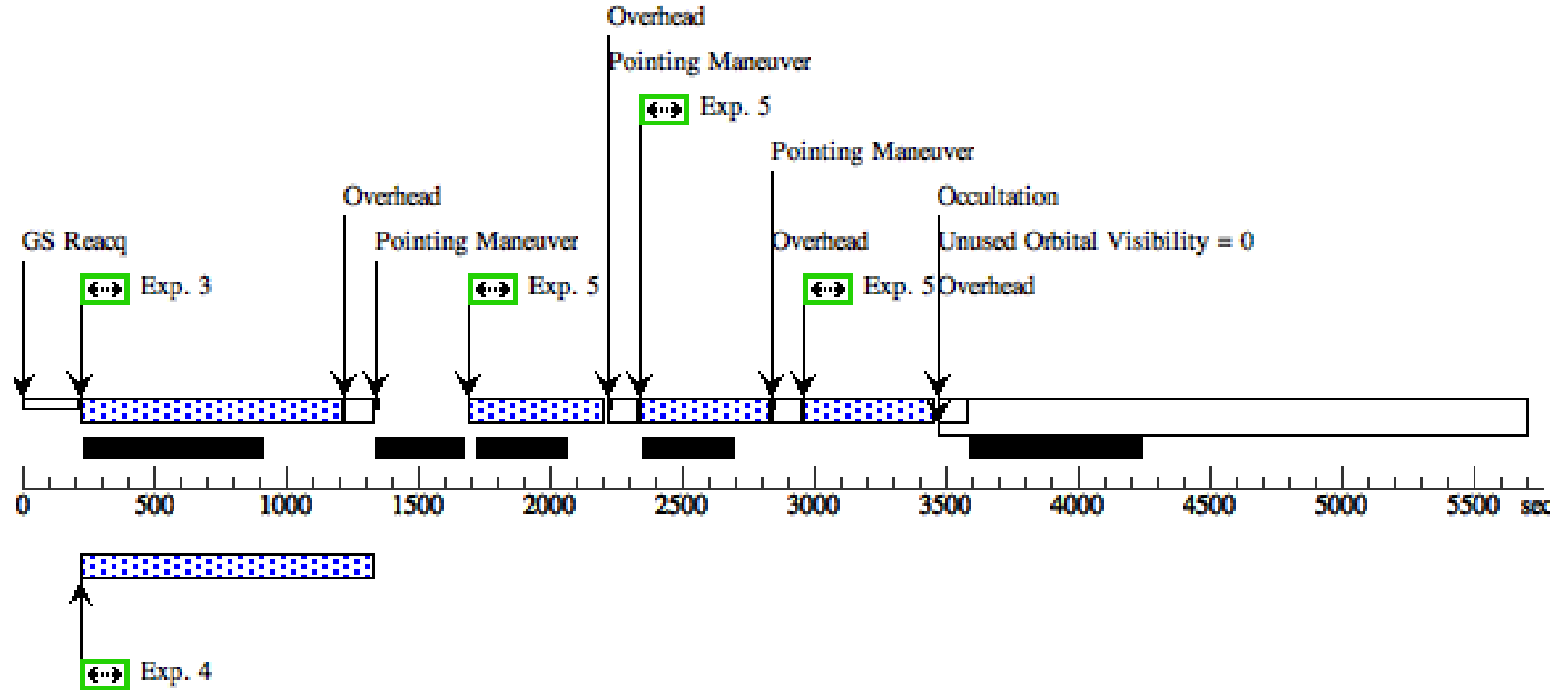
Proposal 15216 - N6946-UVIS1 Visit (01) - Characterizing the Supernova Remnant Population of the Fireworks Galaxy, NGC 6946

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
Exposures	1	(1) NGC6946-UVIS1	WFC3/UVIS, ACCUM, UVIS-FIX	F657N	FLASH=10		Pattern 1, Exps 1-2 in N6946-UVIS1 Visit (01) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in N6946-UVIS1 Visit (01)	850 Secs (2826 Secs) [==>942.0 Secs (Pattern 1)] [==>942.0 Secs (Pattern 2)] [==>942.0 Secs (Pattern 3)]	[1]
	2	ANY	ACS/WFC, ACCUM, WFC-FIX	F606W			Pattern 1, Exps 1-2 in N6946-UVIS1 Visit (01) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in N6946-UVIS1 Visit (01)	800 Secs (2536 Secs) [==>816.0 Secs (Pattern 1)] [==>910.0 Secs (Pattern 2)] [==>810.0 Secs (Pattern 3)]	[1]
	3	(1) NGC6946-UVIS1	WFC3/UVIS, ACCUM, UVIS-FIX	F673N	FLASH=10		Pattern 3, Exps 3-4 in N6946-UVIS1 Visit (01) (3) Prime + Parallel Group 3-4 in Pattern 3, Exps 3-4 in N6946-UVIS1 Visit (01)	950 Secs (3853 Secs) [==>954.0 Secs (Pattern 1)] [==>954.0 Secs (Pattern 2)] [==>954.0 Secs (Pattern 3)] [==>991.0 Secs (Pattern 4)]	[2] [3]
	4	ANY	ACS/WFC, ACCUM, WFC-FIX	F814W			Pattern 3, Exps 3-4 in N6946-UVIS1 Visit (01) (3) Prime + Parallel Group 3-4 in Pattern 3, Exps 3-4 in N6946-UVIS1 Visit (01)	900 Secs (3717 Secs) [==>900.0 Secs (Pattern 1)] [==>930.0 Secs (Pattern 2)] [==>(Pattern 3)] [==>987.0 Secs (Pattern 4)]	[2] [3]
	5	(1) NGC6946-UVIS1	WFC3/UVIS, ACCUM, UVIS-FIX	F547M	FLASH=7		Pattern 1, Exps 5-5 in N6946-UVIS1 Visit (01) (1)	450 Secs (1473 Secs) [==>491.0 Secs (Pattern 1)] [==>491.0 Secs (Pattern 2)] [==>491.0 Secs (Pattern 3)]	[3]



Orbit 3

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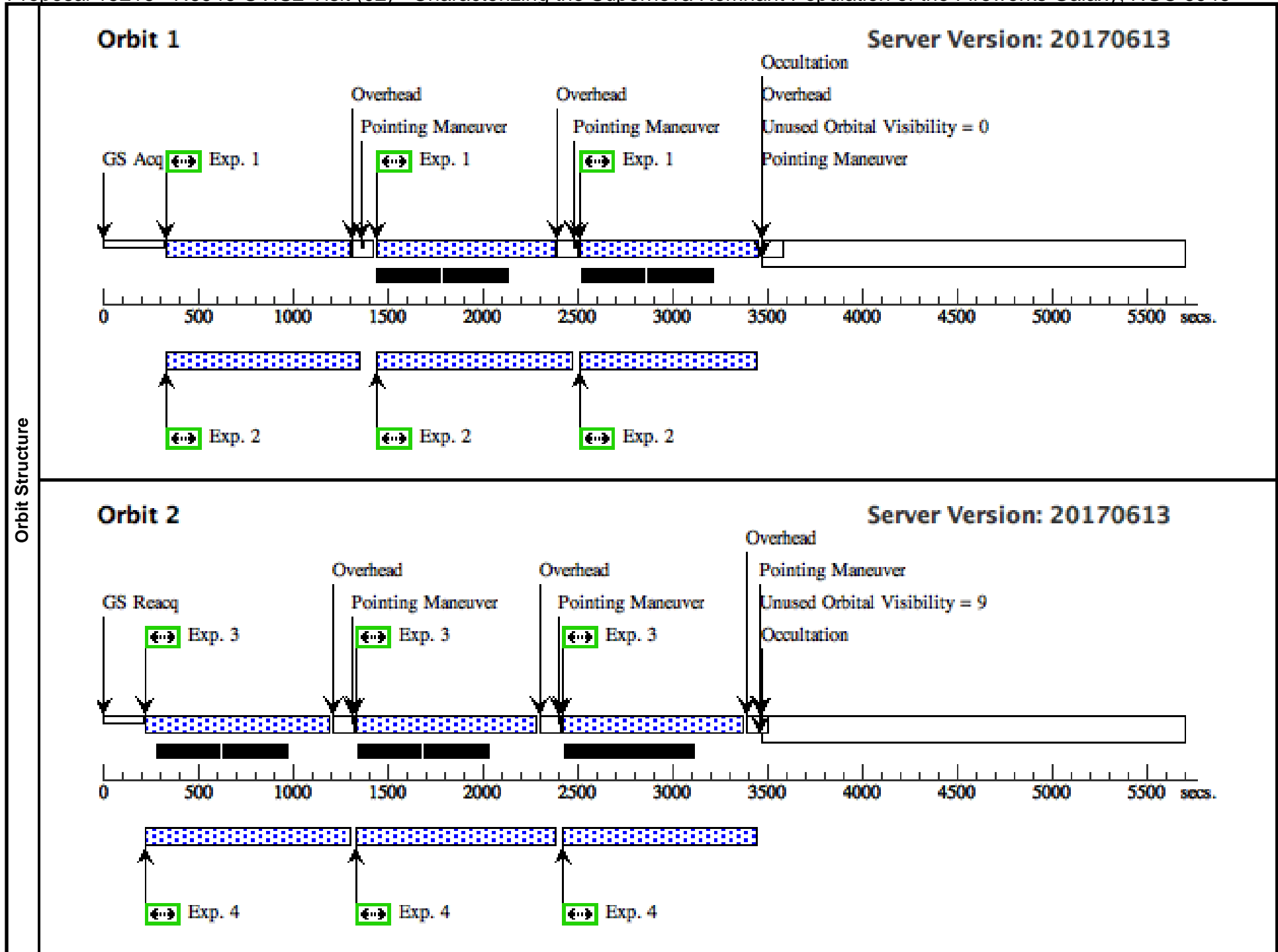
Proposal 15216 - N6946-UVIS2 Visit (02) - Characterizing the Supernova Remnant Population of the Fireworks Galaxy, NGC 6946

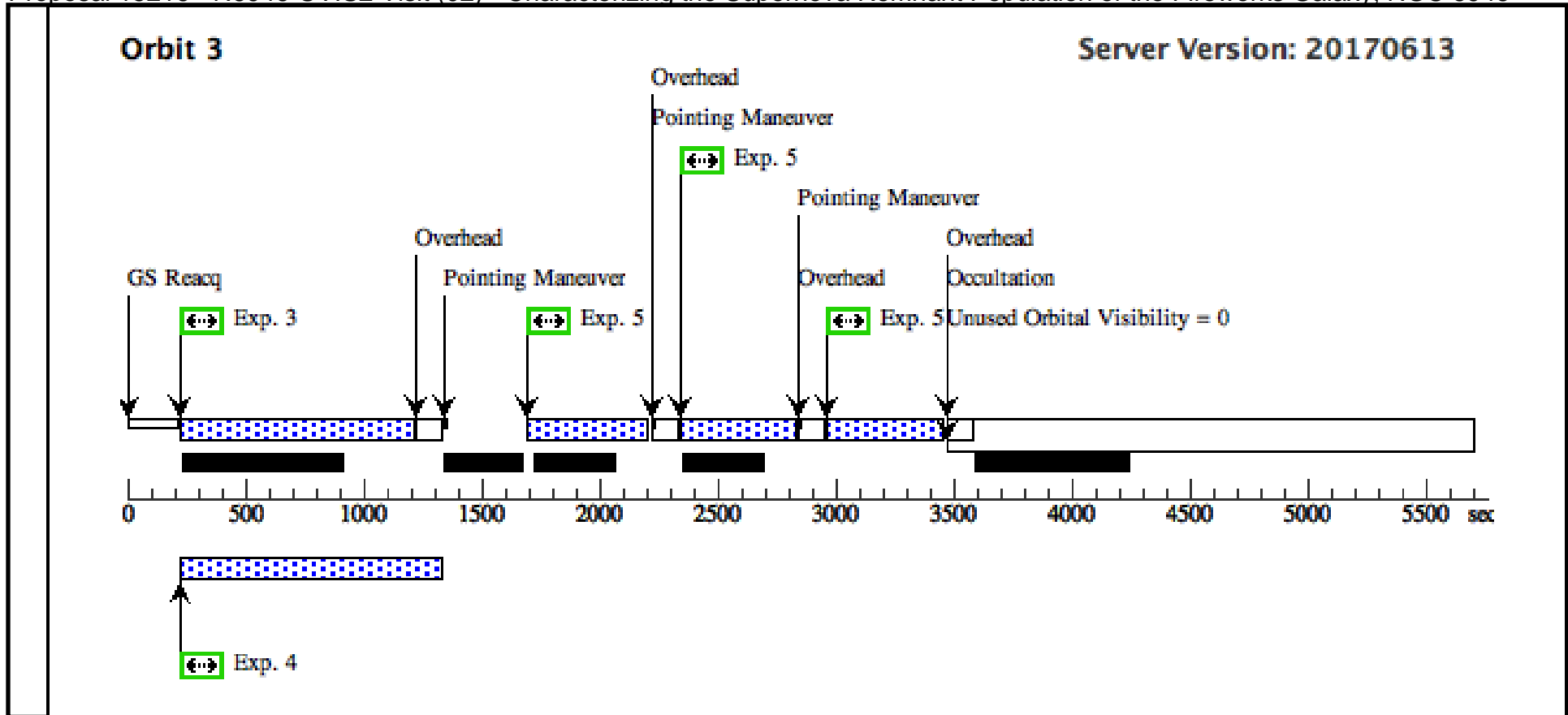
Wed Jul 19 21:04:13 GMT 2017

Visit	Proposal 15216, N6946-UVIS2 Visit (02) Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS, ACS/WFC Special Requirements: SAME ORIENT AS 01					
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Patterns	(1)	Pattern Type=WFC3-UVIS-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=1.605 Line Spacing= Coordinate Frame=POS-TARG Pattern Orientation=86.7 Angle Between Sides= Center Pattern=false		(1-2), (5)		
	(3)	Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=1.605 Line Spacing=0.112 Coordinate Frame=POS-TARG Pattern Orientation=86.7 Angle Between Sides=81.6 Center Pattern=false		(3-4)		
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(2)	NGC6946-UVIS2	RA: 20 34 57.6210 (308.7400875d) Dec: +60 12 4.27 (60.20119d) Equinox: J2000		V=14	Reference Frame: ICRS

Proposal 15216 - N6946-UVIS2 Visit (02) - Characterizing the Supernova Remnant Population of the Fireworks Galaxy, NGC 6946

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
Exposures	1	(2) NGC6946-UVIS 2	WFC3/UVIS, ACCUM, UVIS-FIX	F657N	FLASH=10		Pattern 1, Exps 1-2 in N6946-UVIS2 Visit (02) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in N6946-UVIS2 Visit (02)	850 Secs (2826 Secs) [==>942.0 Secs (Pattern 1)] [==>942.0 Secs (Pattern 2)] [==>942.0 Secs (Pattern 3)]	[1]
	2	ANY	ACS/WFC, ACCUM, WFC-FIX	F606W			Pattern 1, Exps 1-2 in N6946-UVIS2 Visit (02) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in N6946-UVIS2 Visit (02)	800 Secs (2536 Secs) [==>816.0 Secs (Pattern 1)] [==>910.0 Secs (Pattern 2)] [==>810.0 Secs (Pattern 3)]	[1]
	3	(2) NGC6946-UVIS 2	WFC3/UVIS, ACCUM, UVIS-FIX	F673N	FLASH=10		Pattern 3, Exps 3-4 in N6946-UVIS2 Visit (02) (3) Prime + Parallel Group 3-4 in Pattern 3, Exps 3-4 in N6946-UVIS2 Visit (02)	950 Secs (3853 Secs) [==>954.0 Secs (Pattern 1)] [==>954.0 Secs (Pattern 2)] [==>954.0 Secs (Pattern 3)] [==>991.0 Secs (Pattern 4)]	[2] [3]
	4	ANY	ACS/WFC, ACCUM, WFC-FIX	F814W			Pattern 3, Exps 3-4 in N6946-UVIS2 Visit (02) (3) Prime + Parallel Group 3-4 in Pattern 3, Exps 3-4 in N6946-UVIS2 Visit (02)	900 Secs (3717 Secs) [==>900.0 Secs (Pattern 1)] [==>930.0 Secs (Pattern 2)] [==>(Pattern 3)] [==>987.0 Secs (Pattern 4)]	[2] [3]
	5	(2) NGC6946-UVIS 2	WFC3/UVIS, ACCUM, UVIS-FIX	F547M	FLASH=7		Pattern 1, Exps 5-5 in N6946-UVIS2 Visit (02) (1)	450 Secs (1473 Secs) [==>491.0 Secs (Pattern 1)] [==>491.0 Secs (Pattern 2)] [==>491.0 Secs (Pattern 3)]	[3]





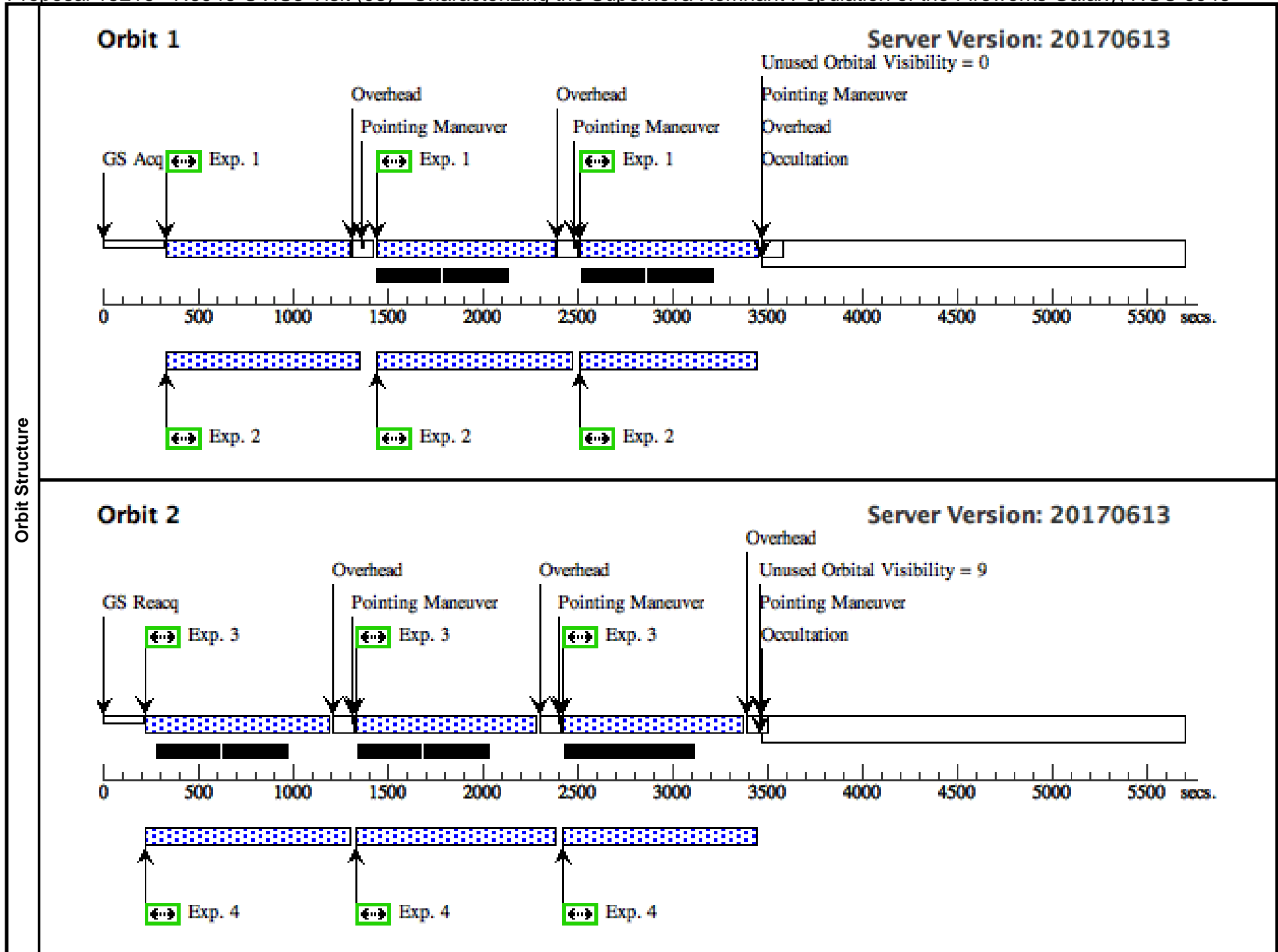
Proposal 15216 - N6946-UVIS3 Visit (03) - Characterizing the Supernova Remnant Population of the Fireworks Galaxy, NGC 6946

Wed Jul 19 21:04:14 GMT 2017

Visit	Proposal 15216, N6946-UVIS3 Visit (03) Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS, ACS/WFC Special Requirements: SAME ORIENT AS 01					
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures	
(1)		Pattern Type=WFC3-UVIS-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=1.605 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=86.7 Angle Between Sides= Center Pattern=false		(1-2), (5)	
(3)		Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=1.605 Line Spacing=0.112	Coordinate Frame=POS-TARG Pattern Orientation=86.7 Angle Between Sides=81.6 Center Pattern=false		(3-4)	
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(3)	NGC6946-UVIS3	RA: 20 34 30.5590 (308.6273292d) Dec: +60 08 34.35 (60.14287d) Equinox: J2000		V=14	Reference Frame: ICRS

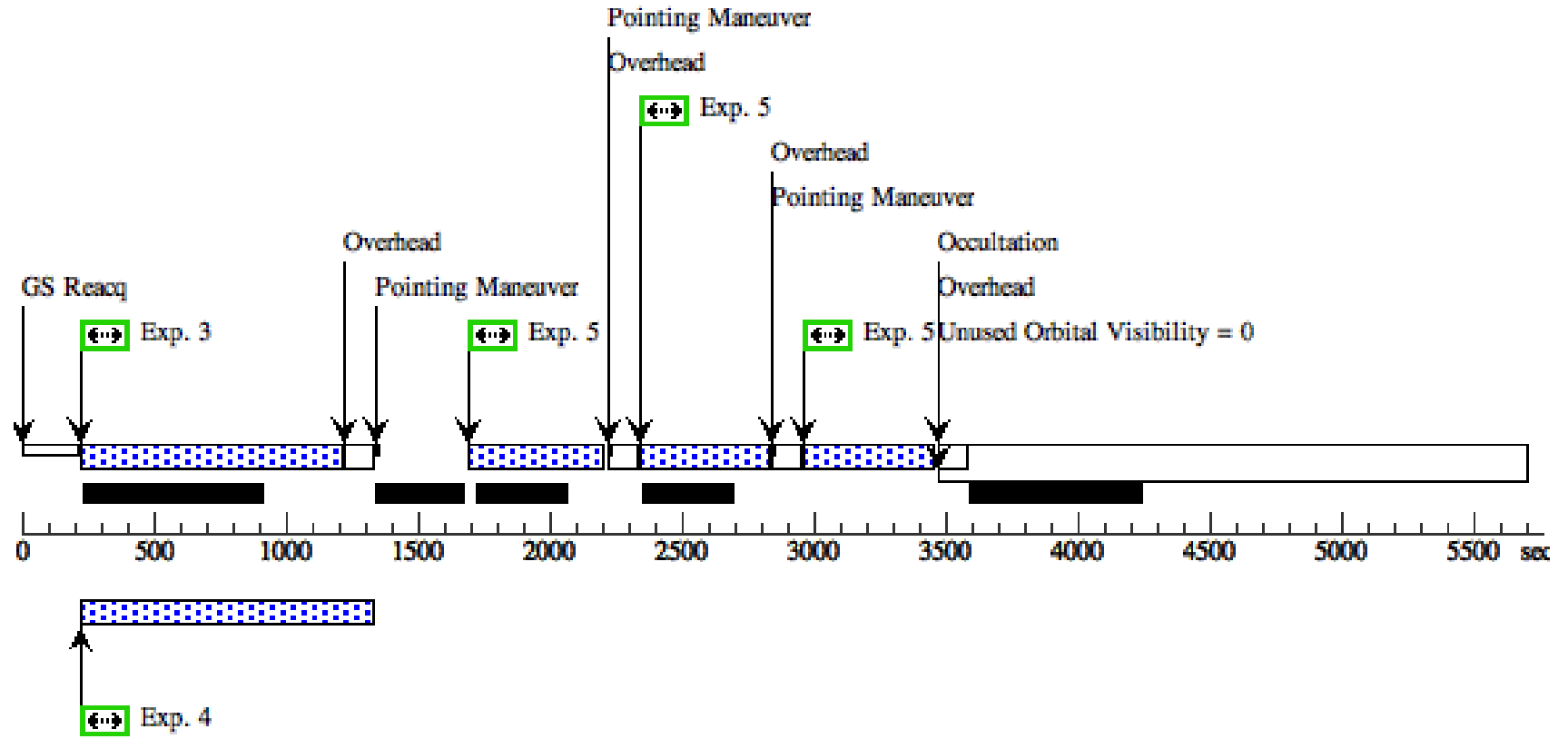
Proposal 15216 - N6946-UVIS3 Visit (03) - Characterizing the Supernova Remnant Population of the Fireworks Galaxy, NGC 6946

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(3) NGC6946-UVIS 3	WFC3/UVIS, ACCUM, UVIS-FIX	F657N	FLASH=10		Pattern 1, Exps 1-2 in N6946-UVIS3 Visit (03) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in N6946-UVIS3 Visit (03)	850 Secs (2826 Secs) [==>942.0 Secs (Pattern 1)] [==>942.0 Secs (Pattern 2)] [==>942.0 Secs (Pattern 3)]	[1]
	2		ANY	ACS/WFC, ACCUM, WFC-FIX	F606W			Pattern 1, Exps 1-2 in N6946-UVIS3 Visit (03) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in N6946-UVIS3 Visit (03)	800 Secs (2536 Secs) [==>816.0 Secs (Pattern 1)] [==>910.0 Secs (Pattern 2)] [==>810.0 Secs (Pattern 3)]	[1]
	3		(3) NGC6946-UVIS 3	WFC3/UVIS, ACCUM, UVIS-FIX	F673N	FLASH=10		Pattern 3, Exps 3-4 in N6946-UVIS3 Visit (03) (3) Prime + Parallel Group 3-4 in Pattern 3, Exps 3-4 in N6946-UVIS3 Visit (03)	950 Secs (3853 Secs) [==>954.0 Secs (Pattern 1)] [==>954.0 Secs (Pattern 2)] [==>954.0 Secs (Pattern 3)] [==>991.0 Secs (Pattern 4)]	[2] [3]
	4		ANY	ACS/WFC, ACCUM, WFC-FIX	F814W			Pattern 3, Exps 3-4 in N6946-UVIS3 Visit (03) (3) Prime + Parallel Group 3-4 in Pattern 3, Exps 3-4 in N6946-UVIS3 Visit (03)	900 Secs (3717 Secs) [==>900.0 Secs (Pattern 1)] [==>930.0 Secs (Pattern 2)] [==>(Pattern 3)] [==>987.0 Secs (Pattern 4)]	[2] [3]
	5		(3) NGC6946-UVIS 3	WFC3/UVIS, ACCUM, UVIS-FIX	F547M	FLASH=7		Pattern 1, Exps 5-5 in N6946-UVIS3 Visit (03) (1)	450 Secs (1473 Secs) [==>491.0 Secs (Pattern 1)] [==>491.0 Secs (Pattern 2)] [==>491.0 Secs (Pattern 3)]	[3]



Orbit 3

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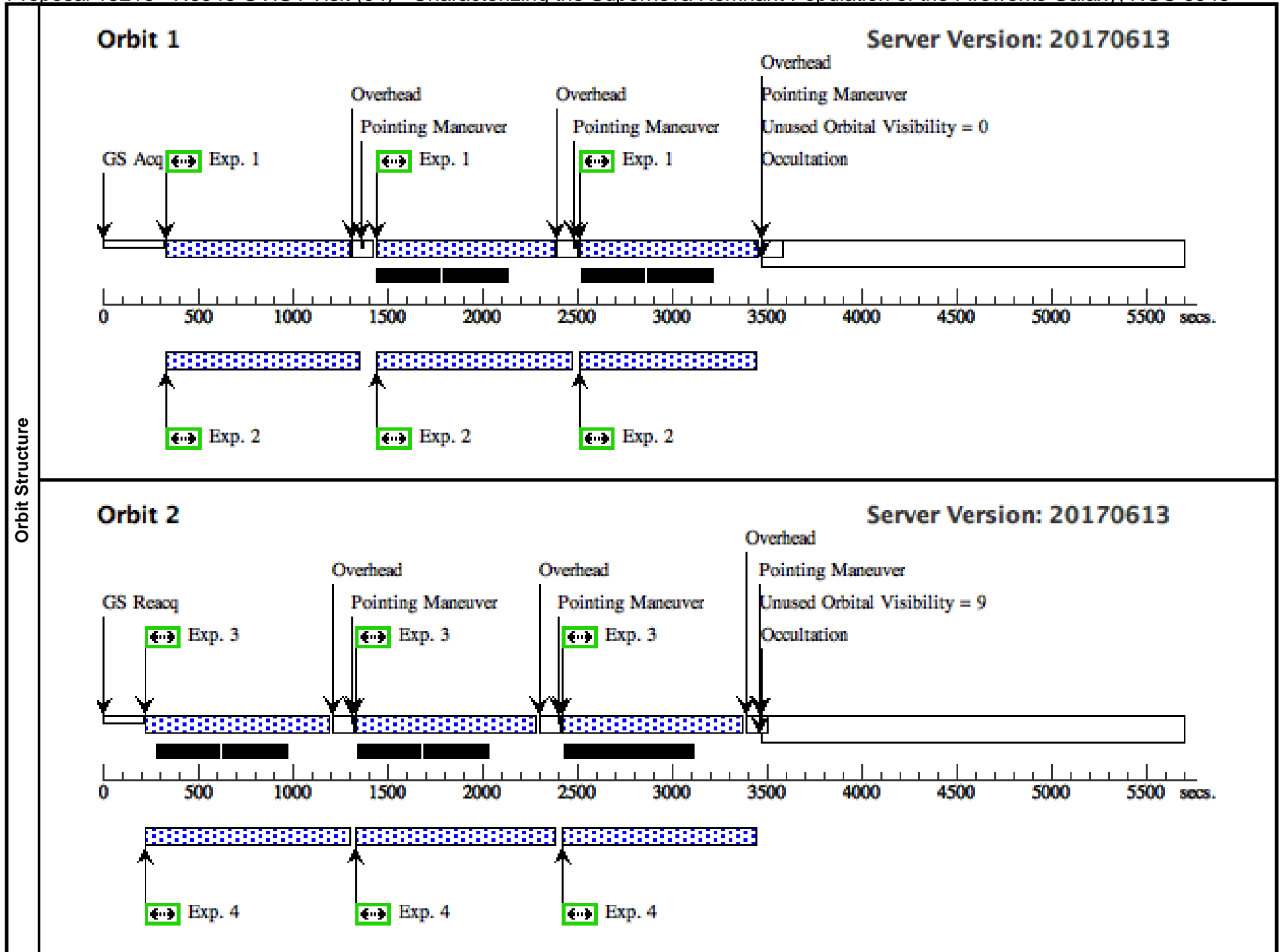
Proposal 15216 - N6946-UVIS4 Visit (04) - Characterizing the Supernova Remnant Population of the Fireworks Galaxy, NGC 6946

Wed Jul 19 21:04:14 GMT 2017

Visit	Proposal 15216, N6946-UVIS4 Visit (04) Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS, ACS/WFC Special Requirements: SAME ORIENT AS 01					
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(1)		Pattern Type=WFC3-UVIS-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=1.605 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=86.7 Angle Between Sides= Center Pattern=false		(1-2), (5)	
(3)		Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=1.605 Line Spacing=0.112	Coordinate Frame=POS-TARG Pattern Orientation=86.7 Angle Between Sides=81.6 Center Pattern=false		(3-4)	
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(4)	NGC6946-UVIS4	RA: 20 34 51.4740 (308.7144750d) Dec: +60 09 31.21 (60.15867d) Equinox: J2000		V=12	Reference Frame: ICRS

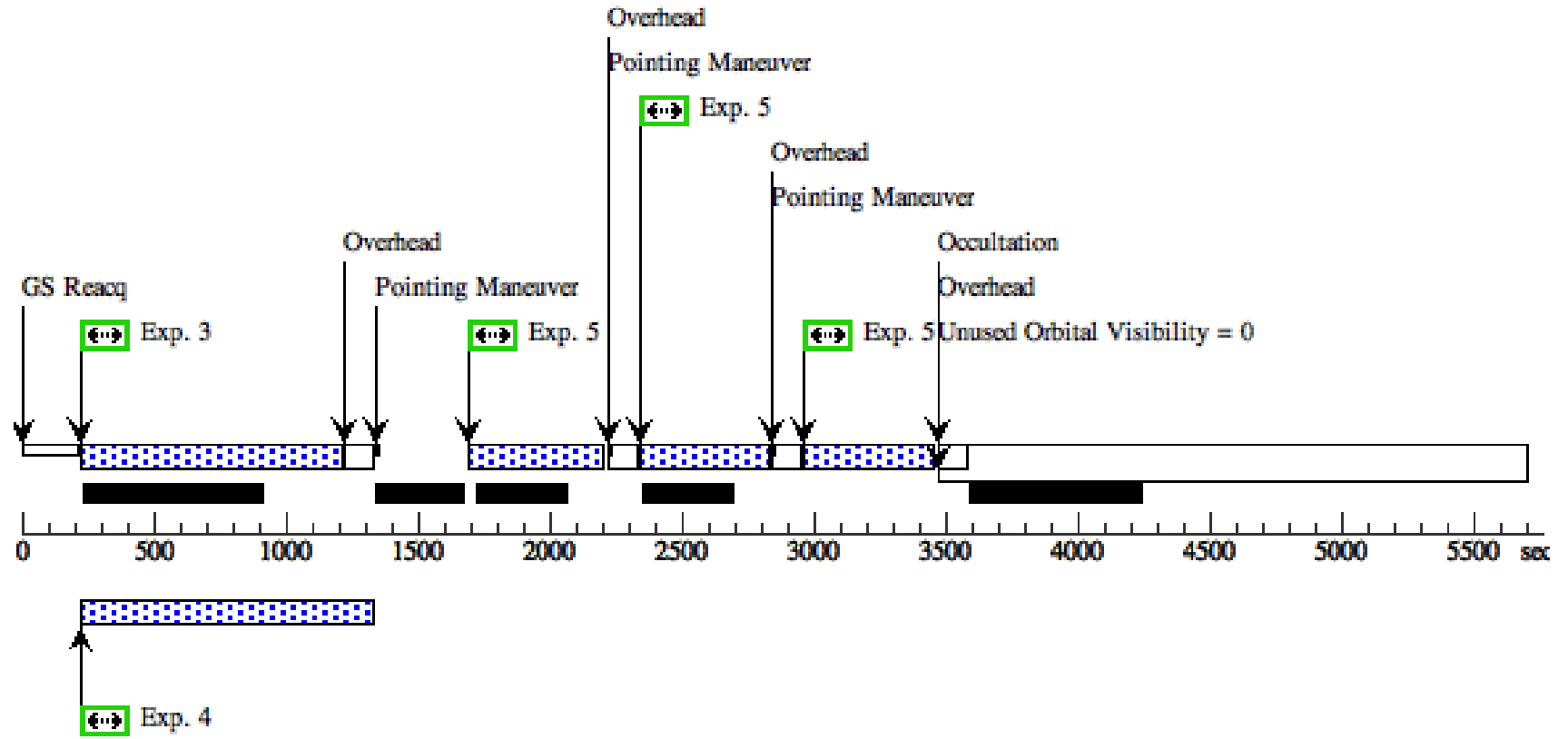
Proposal 15216 - N6946-UVIS4 Visit (04) - Characterizing the Supernova Remnant Population of the Fireworks Galaxy, NGC 6946

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
Exposures	1	(4) NGC6946-UVIS4	WFC3/UVIS, ACCUM, UVIS-FIX	F657N	FLASH=10		Pattern 1, Exps 1-2 in N6946-UVIS4 Visit (04) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in N6946-UVIS4 Visit (04)	850 Secs (2826 Secs) [==>942.0 Secs (Pattern 1)] [==>942.0 Secs (Pattern 2)] [==>942.0 Secs (Pattern 3)]	[1]
	2	ANY	ACS/WFC, ACCUM, WFC-FIX	F606W			Pattern 1, Exps 1-2 in N6946-UVIS4 Visit (04) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in N6946-UVIS4 Visit (04)	800 Secs (2536 Secs) [==>816.0 Secs (Pattern 1)] [==>910.0 Secs (Pattern 2)] [==>810.0 Secs (Pattern 3)]	[1]
	3	(4) NGC6946-UVIS4	WFC3/UVIS, ACCUM, UVIS-FIX	F673N	FLASH=10		Pattern 3, Exps 3-4 in N6946-UVIS4 Visit (04) (3) Prime + Parallel Group 3-4 in Pattern 3, Exps 3-4 in N6946-UVIS4 Visit (04)	950 Secs (3853 Secs) [==>954.0 Secs (Pattern 1)] [==>954.0 Secs (Pattern 2)] [==>954.0 Secs (Pattern 3)] [==>991.0 Secs (Pattern 4)]	[2] [3]
	4	ANY	ACS/WFC, ACCUM, WFC-FIX	F814W			Pattern 3, Exps 3-4 in N6946-UVIS4 Visit (04) (3) Prime + Parallel Group 3-4 in Pattern 3, Exps 3-4 in N6946-UVIS4 Visit (04)	900 Secs (3717 Secs) [==>900.0 Secs (Pattern 1)] [==>930.0 Secs (Pattern 2)] [==>(Pattern 3)] [==>987.0 Secs (Pattern 4)]	[2] [3]
	5	(4) NGC6946-UVIS4	WFC3/UVIS, ACCUM, UVIS-FIX	F547M	FLASH=7		Pattern 1, Exps 5-5 in N6946-UVIS4 Visit (04) (1)	450 Secs (1473 Secs) [==>491.0 Secs (Pattern 1)] [==>491.0 Secs (Pattern 2)] [==>491.0 Secs (Pattern 3)]	[3]



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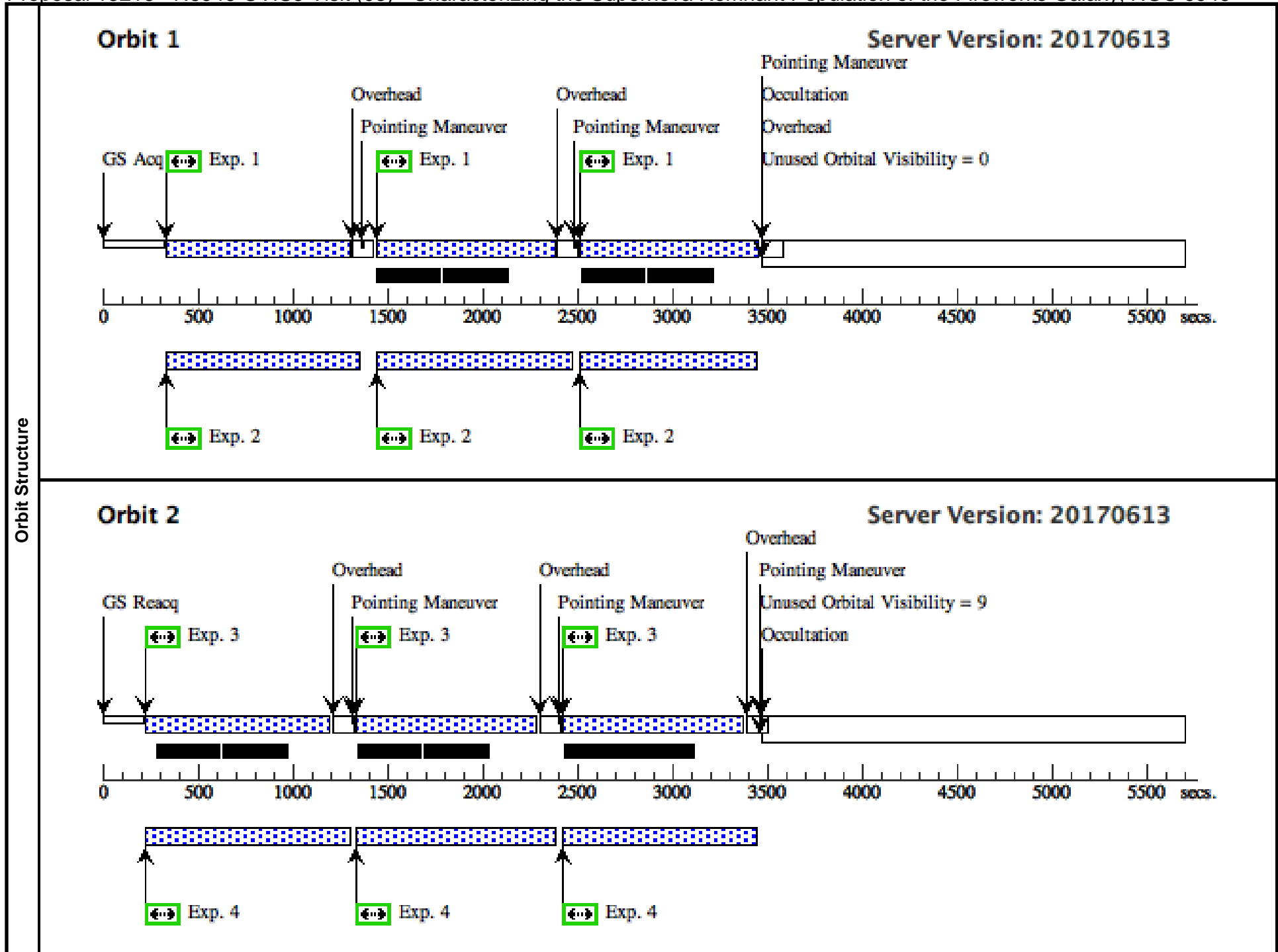
Proposal 15216 - N6946-UVIS5 Visit (05) - Characterizing the Supernova Remnant Population of the Fireworks Galaxy, NGC 6946

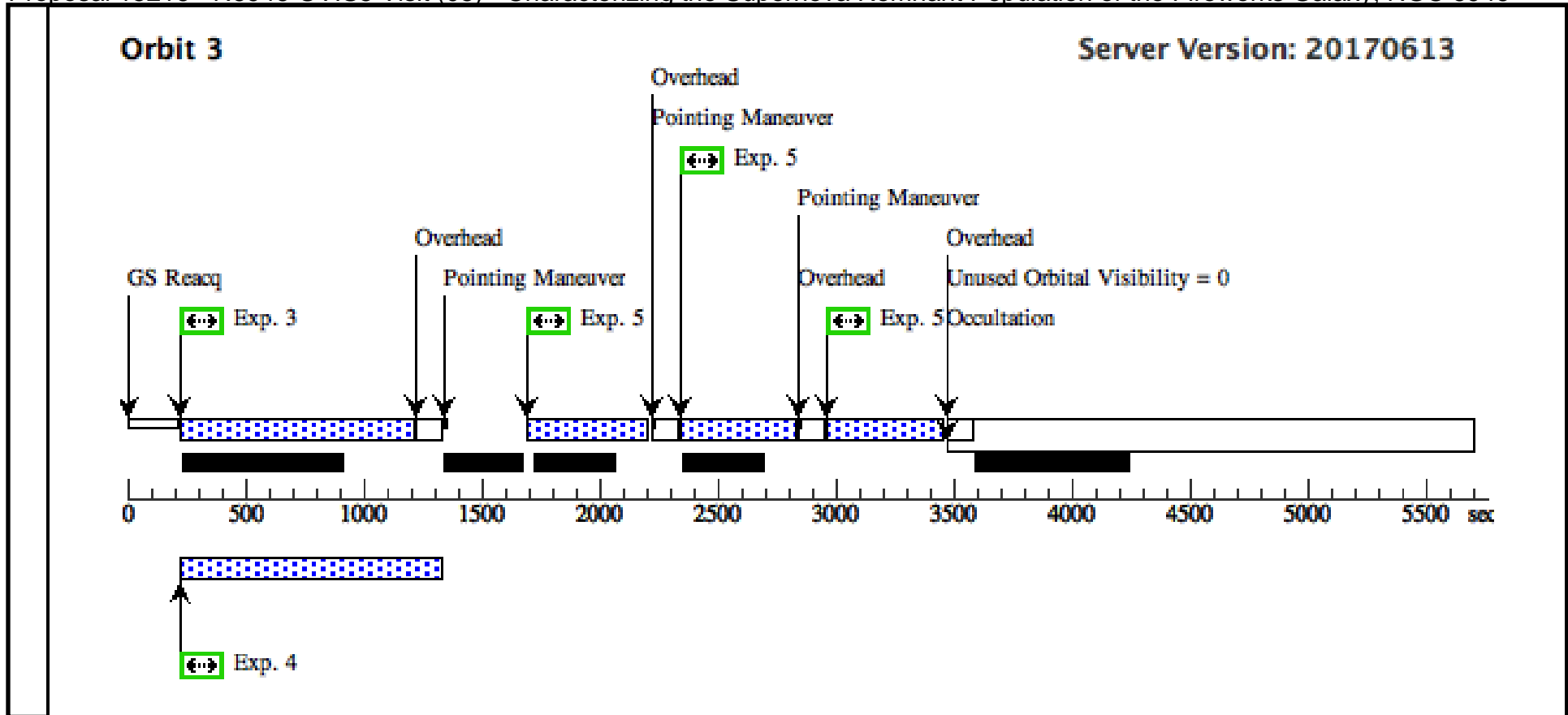
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	(3)	Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=1.605 Line Spacing=0.112	Coordinate Frame=POS-TARG Pattern Orientation=86.7 Angle Between Sides=81.6 Center Pattern=false		(3-4)	
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(5)	NGC6946-UVIS5	RA: 20 34 45.9700 (308.6915417d) Dec: +60 06 53.93 (60.11498d) Equinox: J2000		V=14	Reference Frame: ICRS

Proposal 15216 - N6946-UVIS5 Visit (05) - Characterizing the Supernova Remnant Population of the Fireworks Galaxy, NGC 6946

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(5) NGC6946-UVIS 5	WFC3/UVIS, ACCUM, UVIS-FIX	F657N	FLASH=10		Pattern 1, Exps 1-2 in N6946-UVIS5 Visit (05) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in N6946-UVIS5 Visit (05)	850 Secs (2826 Secs) [==>942.0 Secs (Pattern 1)] [==>942.0 Secs (Pattern 2)] [==>942.0 Secs (Pattern 3)]	[1]
	2		ANY	ACS/WFC, ACCUM, WFC-FIX	F606W			Pattern 1, Exps 1-2 in N6946-UVIS5 Visit (05) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in N6946-UVIS5 Visit (05)	800 Secs (2536 Secs) [==>816.0 Secs (Pattern 1)] [==>910.0 Secs (Pattern 2)] [==>810.0 Secs (Pattern 3)]	[1]
	3		(5) NGC6946-UVIS 5	WFC3/UVIS, ACCUM, UVIS-FIX	F673N	FLASH=10		Pattern 3, Exps 3-4 in N6946-UVIS5 Visit (05) (3) Prime + Parallel Group 3-4 in Pattern 3, Exps 3-4 in N6946-UVIS5 Visit (05)	950 Secs (3853 Secs) [==>954.0 Secs (Pattern 1)] [==>954.0 Secs (Pattern 2)] [==>954.0 Secs (Pattern 3)] [==>991.0 Secs (Pattern 4)]	[2] [3]
	4		ANY	ACS/WFC, ACCUM, WFC-FIX	F814W			Pattern 3, Exps 3-4 in N6946-UVIS5 Visit (05) (3) Prime + Parallel Group 3-4 in Pattern 3, Exps 3-4 in N6946-UVIS5 Visit (05)	900 Secs (3717 Secs) [==>900.0 Secs (Pattern 1)] [==>930.0 Secs (Pattern 2)] [==>(Pattern 3)] [==>987.0 Secs (Pattern 4)]	[2] [3]
	5		(5) NGC6946-UVIS 5	WFC3/UVIS, ACCUM, UVIS-FIX	F547M	FLASH=7		Pattern 1, Exps 5-5 in N6946-UVIS5 Visit (05) (1)	450 Secs (1473 Secs) [==>491.0 Secs (Pattern 1)] [==>491.0 Secs (Pattern 2)] [==>491.0 Secs (Pattern 3)]	[3]





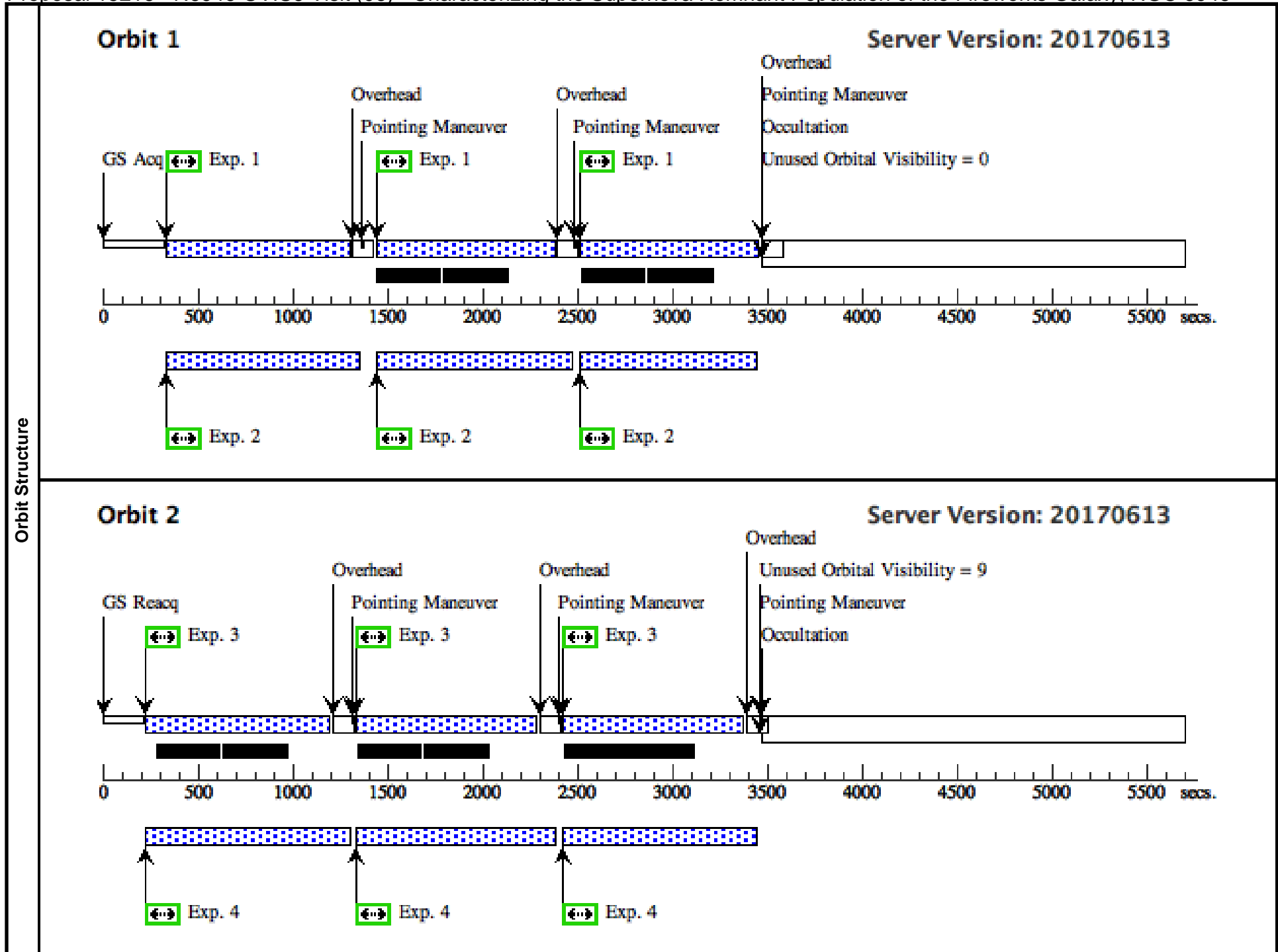
Proposal 15216 - N6946-UVIS6 Visit (06) - Characterizing the Supernova Remnant Population of the Fireworks Galaxy, NGC 6946

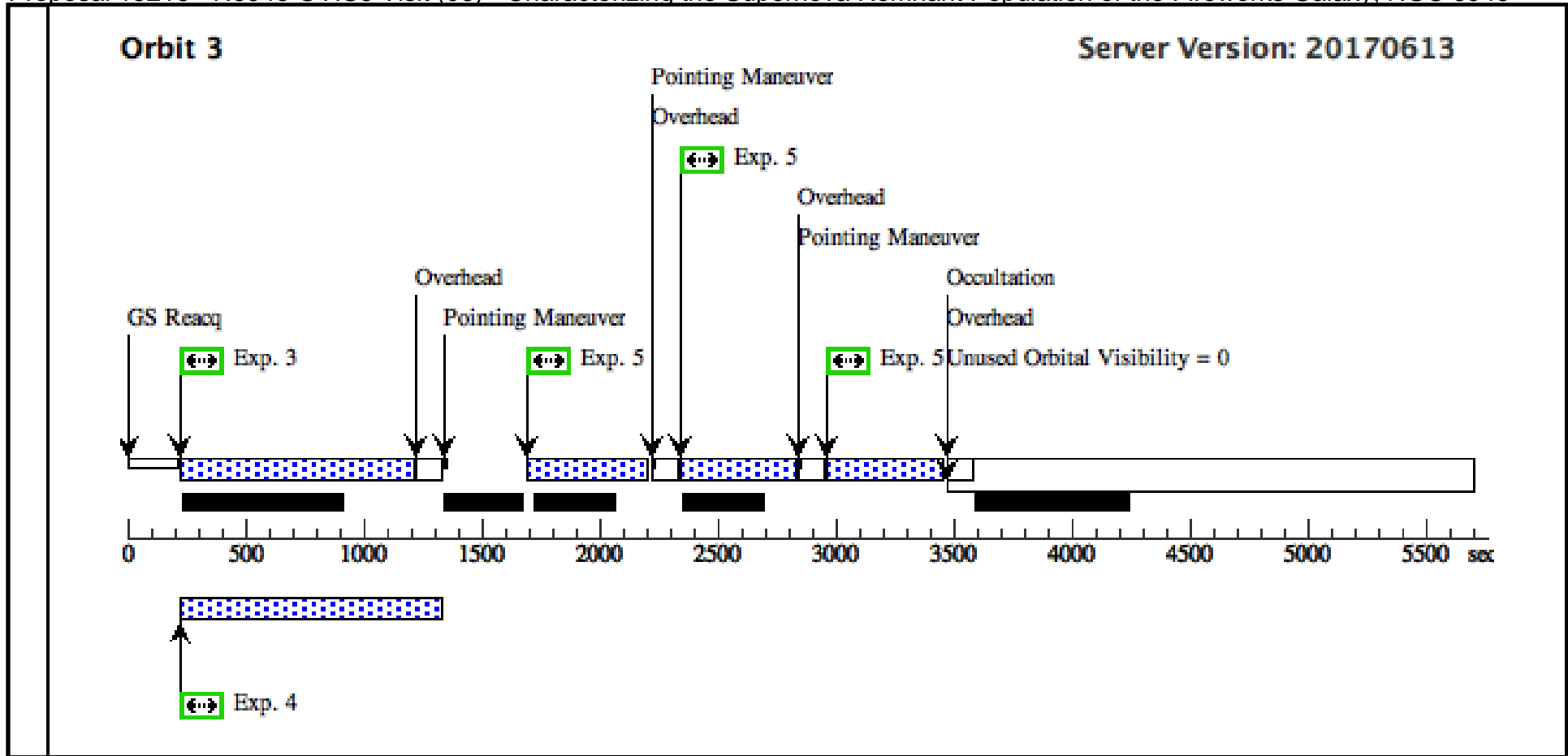
Wed Jul 19 21:04:14 GMT 2017

Visit	Proposal 15216, N6946-UVIS6 Visit (06)					
		Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS, ACS/WFC Special Requirements: SAME ORIENT AS 01				
Patterns	#	Primary Pattern	Secondary Pattern	Exposures		
	(1)	Pattern Type=WFC3-UVIS-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=1.605 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=86.7 Angle Between Sides= Center Pattern=false		(1-2), (5)	
	(3)	Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=1.605 Line Spacing=0.112	Coordinate Frame=POS-TARG Pattern Orientation=86.7 Angle Between Sides=81.6 Center Pattern=false		(3-4)	
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(6)	NGC6946-UVIS6	RA: 20 35 13.5000 (308.8062500d) Dec: +60 10 24.78 (60.17355d) Equinox: J2000		V=14	Reference Frame: ICRS

Proposal 15216 - N6946-UVIS6 Visit (06) - Characterizing the Supernova Remnant Population of the Fireworks Galaxy, NGC 6946

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(6) NGC6946-UVIS6	WFC3/UVIS, ACCUM, UVIS-FIX	F657N	FLASH=10		Pattern 1, Exps 1-2 in N6946-UVIS6 Visit (06) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in N6946-UVIS6 Visit (06)	850 Secs (2826 Secs) [==>942.0 Secs (Pattern 1)] [==>942.0 Secs (Pattern 2)] [==>942.0 Secs (Pattern 3)]	[1]
	2		ANY	ACS/WFC, ACCUM, WFC-FIX	F606W			Pattern 1, Exps 1-2 in N6946-UVIS6 Visit (06) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in N6946-UVIS6 Visit (06)	800 Secs (2536 Secs) [==>816.0 Secs (Pattern 1)] [==>910.0 Secs (Pattern 2)] [==>810.0 Secs (Pattern 3)]	[1]
	3		(6) NGC6946-UVIS6	WFC3/UVIS, ACCUM, UVIS-FIX	F673N	FLASH=10		Pattern 3, Exps 3-4 in N6946-UVIS6 Visit (06) (3) Prime + Parallel Group 3-4 in Pattern 3, Exps 3-4 in N6946-UVIS6 Visit (06)	950 Secs (3853 Secs) [==>954.0 Secs (Pattern 1)] [==>954.0 Secs (Pattern 2)] [==>954.0 Secs (Pattern 3)] [==>991.0 Secs (Pattern 4)]	[2] [3]
	4		ANY	ACS/WFC, ACCUM, WFC-FIX	F814W			Pattern 3, Exps 3-4 in N6946-UVIS6 Visit (06) (3) Prime + Parallel Group 3-4 in Pattern 3, Exps 3-4 in N6946-UVIS6 Visit (06)	900 Secs (3717 Secs) [==>900.0 Secs (Pattern 1)] [==>930.0 Secs (Pattern 2)] [==>(Pattern 3)] [==>987.0 Secs (Pattern 4)]	[2] [3]
	5		(6) NGC6946-UVIS6	WFC3/UVIS, ACCUM, UVIS-FIX	F547M	FLASH=7		Pattern 1, Exps 5-5 in N6946-UVIS6 Visit (06) (1)	450 Secs (1473 Secs) [==>491.0 Secs (Pattern 1)] [==>491.0 Secs (Pattern 2)] [==>491.0 Secs (Pattern 3)]	[3]





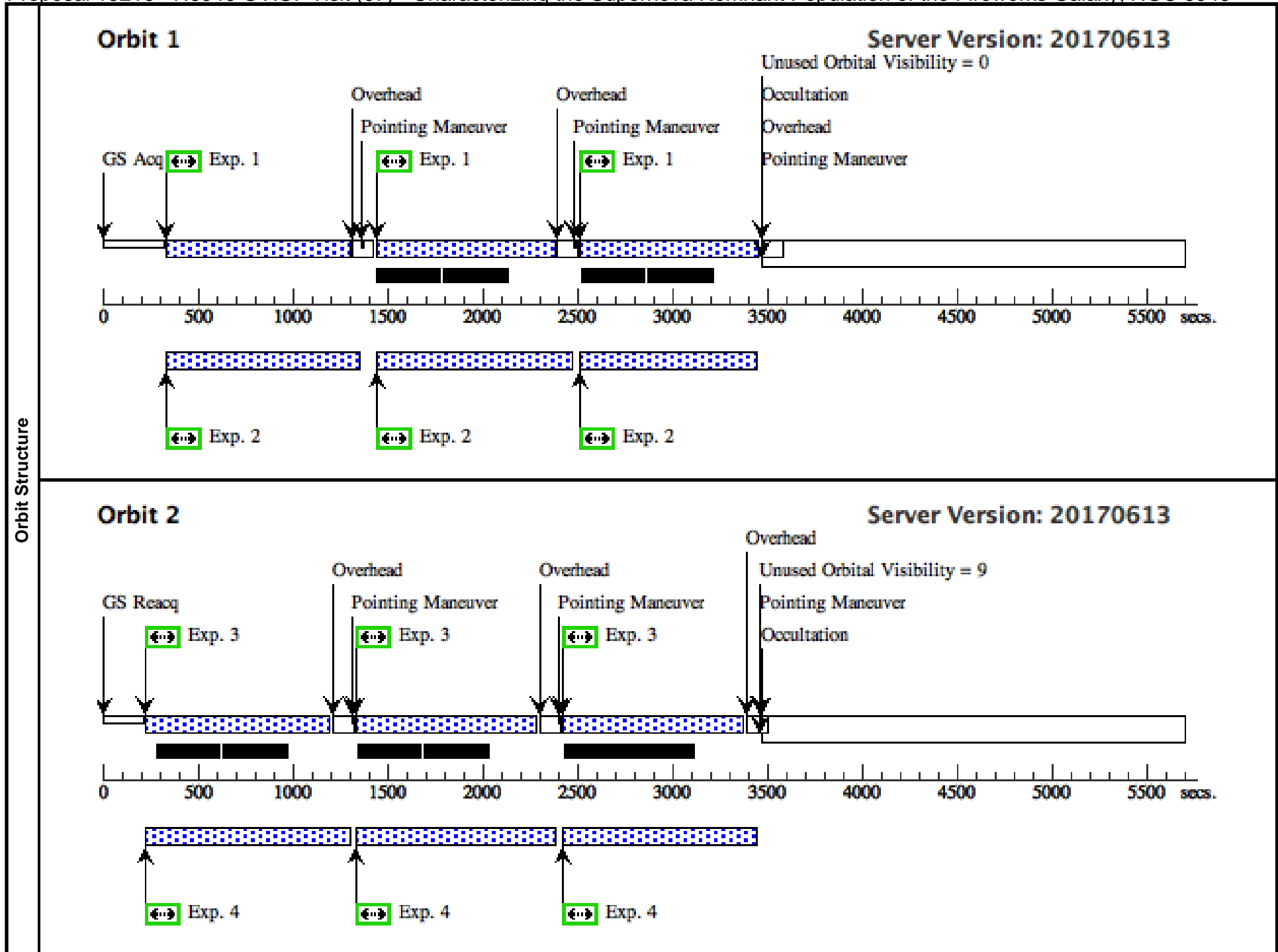
Proposal 15216 - N6946-UVIS7 Visit (07) - Characterizing the Supernova Remnant Population of the Fireworks Galaxy, NGC 6946

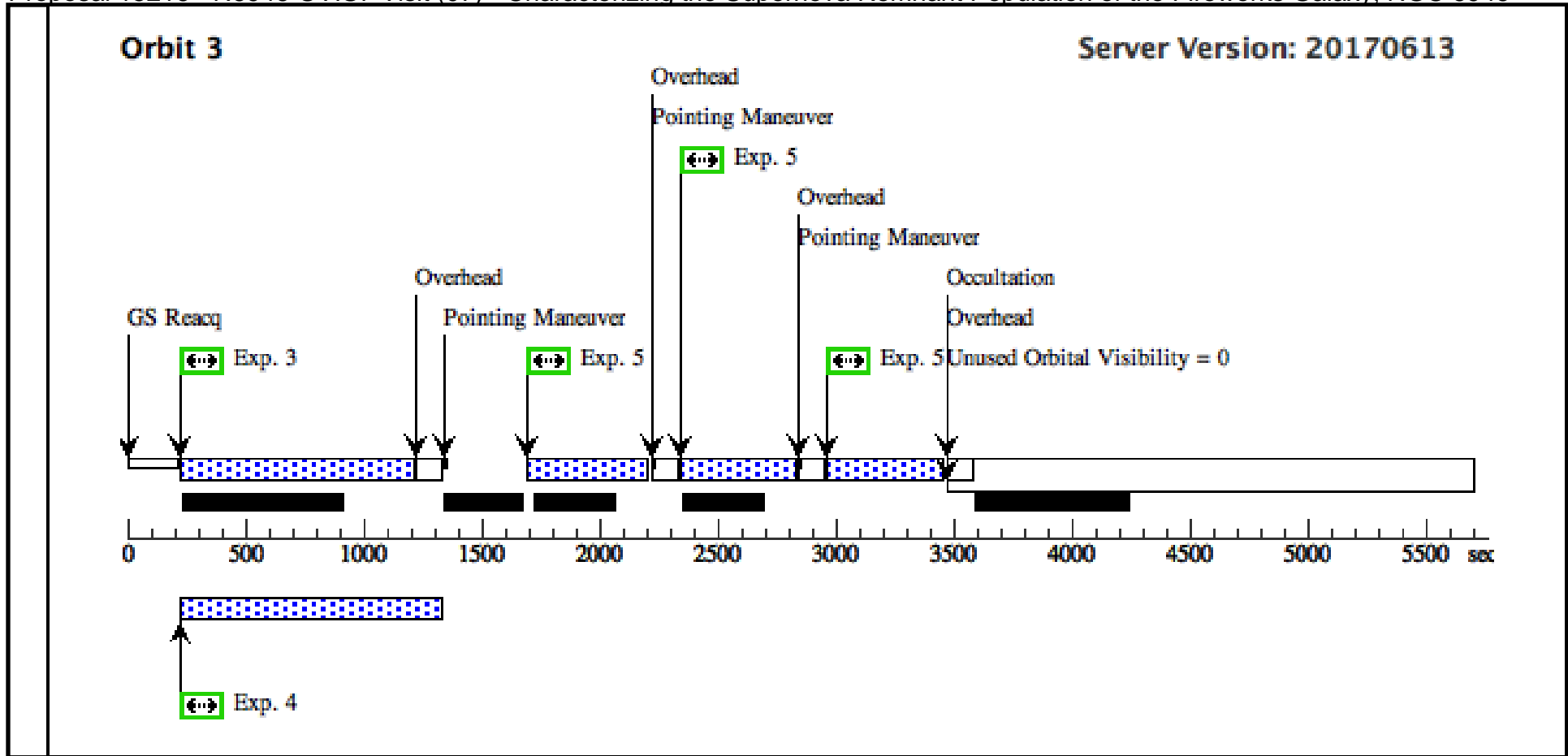
Wed Jul 19 21:04:14 GMT 2017

Visit	Proposal 15216, N6946-UVIS7 Visit (07) Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS, ACS/WFC Special Requirements: SAME ORIENT AS 01					
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures	
(1)		Pattern Type=WFC3-UVIS-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=1.605 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=86.7 Angle Between Sides= Center Pattern=false		(1-2), (5)	
(3)		Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=1.605 Line Spacing=0.112	Coordinate Frame=POS-TARG Pattern Orientation=86.7 Angle Between Sides=81.6 Center Pattern=false		(3-4)	
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(7)	NGC6946-UVIS7	RA: 20 35 5.4327 (308.7726362d) Dec: +60 07 56.76 (60.13243d) Equinox: J2000		V=14	Reference Frame: ICRS

Proposal 15216 - N6946-UVIS7 Visit (07) - Characterizing the Supernova Remnant Population of the Fireworks Galaxy, NGC 6946

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(7) NGC6946-UVIS 7	WFC3/UVIS, ACCUM, UVIS-FIX	F657N	FLASH=10		Pattern 1, Exps 1-2 in N6946-UVIS7 Visit (07) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in N6946-UVIS7 Visit (07)	850 Secs (2826 Secs) [==>942.0 Secs (Pattern 1)] [==>942.0 Secs (Pattern 2)] [==>942.0 Secs (Pattern 3)]	[1]
	2		ANY	ACS/WFC, ACCUM, WFC-FIX	F606W			Pattern 1, Exps 1-2 in N6946-UVIS7 Visit (07) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in N6946-UVIS7 Visit (07)	800 Secs (2536 Secs) [==>816.0 Secs (Pattern 1)] [==>910.0 Secs (Pattern 2)] [==>810.0 Secs (Pattern 3)]	[1]
	3		(7) NGC6946-UVIS 7	WFC3/UVIS, ACCUM, UVIS-FIX	F673N	FLASH=10		Pattern 3, Exps 3-4 in N6946-UVIS7 Visit (07) (3) Prime + Parallel Group 3-4 in Pattern 3, Exps 3-4 in N6946-UVIS7 Visit (07)	950 Secs (3853 Secs) [==>954.0 Secs (Pattern 1)] [==>954.0 Secs (Pattern 2)] [==>954.0 Secs (Pattern 3)] [==>991.0 Secs (Pattern 4)]	[2] [3]
	4		ANY	ACS/WFC, ACCUM, WFC-FIX	F814W			Pattern 3, Exps 3-4 in N6946-UVIS7 Visit (07) (3) Prime + Parallel Group 3-4 in Pattern 3, Exps 3-4 in N6946-UVIS7 Visit (07)	900 Secs (3717 Secs) [==>900.0 Secs (Pattern 1)] [==>930.0 Secs (Pattern 2)] [==>(Pattern 3)] [==>987.0 Secs (Pattern 4)]	[2] [3]
	5		(7) NGC6946-UVIS 7	WFC3/UVIS, ACCUM, UVIS-FIX	F547M	FLASH=7		Pattern 1, Exps 5-5 in N6946-UVIS7 Visit (07) (1)	450 Secs (1473 Secs) [==>491.0 Secs (Pattern 1)] [==>491.0 Secs (Pattern 2)] [==>491.0 Secs (Pattern 3)]	[3]





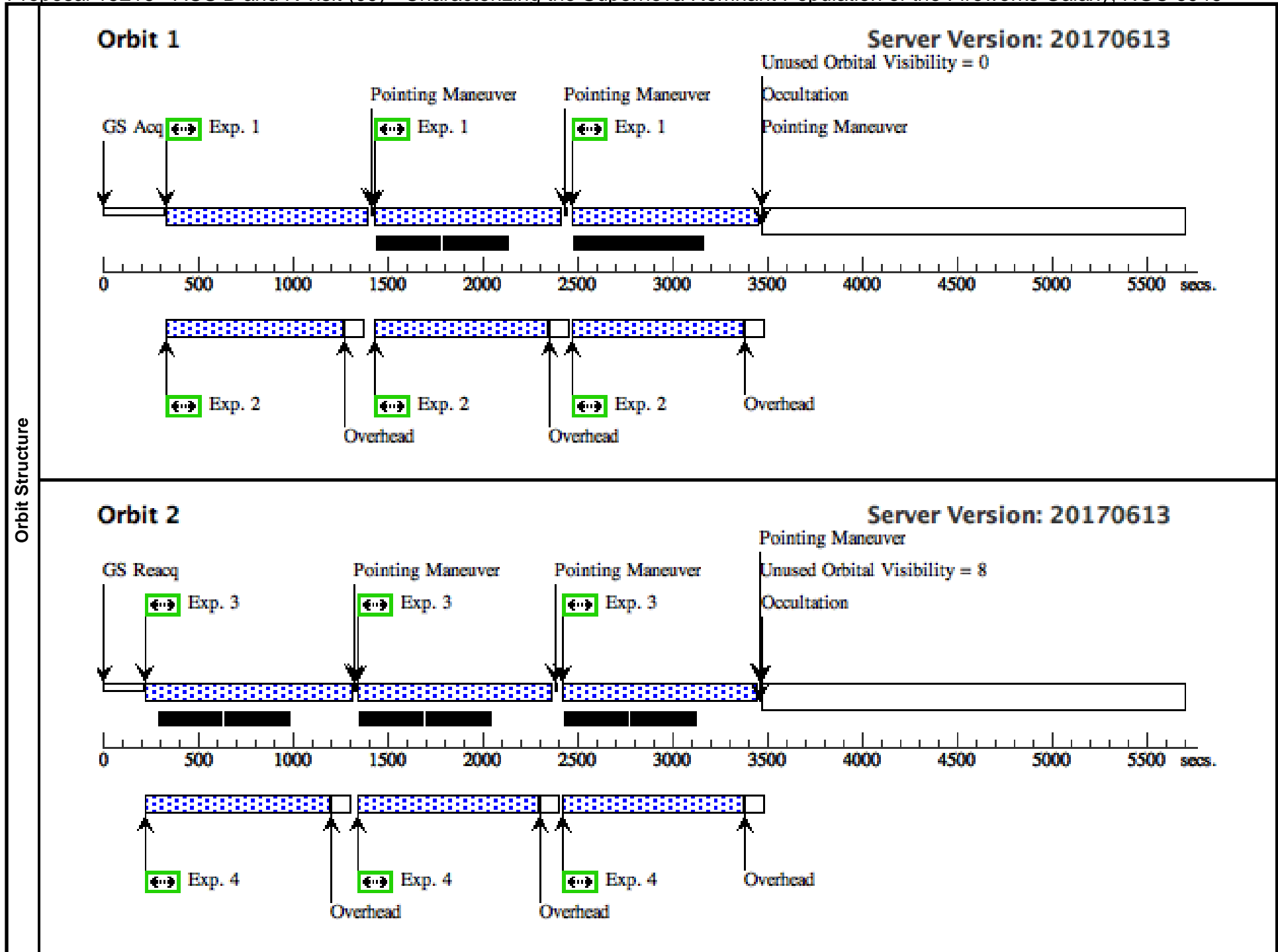
Proposal 15216 - ACS B and R visit (09) - Characterizing the Supernova Remnant Population of the Fireworks Galaxy, NGC 6946

Wed Jul 19 21:04:14 GMT 2017

Visit	Proposal 15216, ACS B and R visit (09) Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS, ACS/WFC Special Requirements: ORIENT 5D TO 30 D					
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures	
	(2)	Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=3 Point Spacing=3.034 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.29 Angle Between Sides= Center Pattern=false		(1-2), (3-4), (5-6), (7-8)	
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(8)	NGC6946-ACS8	RA: 20 34 31.9920 (308.6333000d) Dec: +60 09 39.02 (60.16084d) Equinox: J2000		V=14	Reference Frame: ICRS

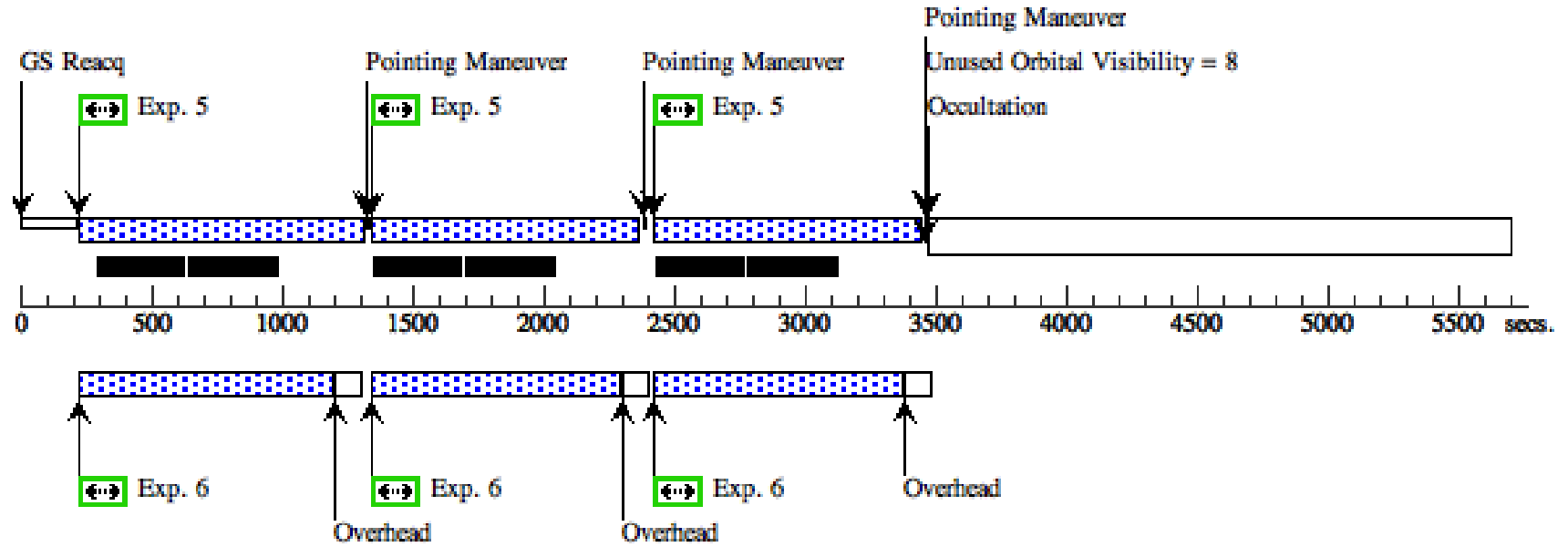
Proposal 15216 - ACS B and R visit (09) - Characterizing the Supernova Remnant Population of the Fireworks Galaxy, NGC 6946

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
Exposures	1	(8) NGC6946-ACS8	ACS/WFC, ACCUM, WFC	F606W			Pattern 2, Exps 1-2 in ACS B and R visit (09) (2) Prime + Parallel Group 1-2 in Pattern 2, Exps 1-2 in ACS B and R visit (09)	850 Secs (2577 Secs) [==>859.0 Secs (Pattern 1)] [==>859.0 Secs (Pattern 2)] [==>859.0 Secs (Pattern 3)]	[1]
	2	ANY	WFC3/UVIS, ACCUM, UVIS-CENTER	F606W			Pattern 2, Exps 1-2 in ACS B and R visit (09) (2) Prime + Parallel Group 1-2 in Pattern 2, Exps 1-2 in ACS B and R visit (09)	900 Secs (2710 Secs) [==>900.0 Secs (Pattern 1)] [==>910.0 Secs (Pattern 2)] [==>900.0 Secs (Pattern 3)]	[1]
	3	(8) NGC6946-ACS8	ACS/WFC, ACCUM, WFC	F435W			Pattern 2, Exps 3-4 in ACS B and R visit (09) (2) Prime + Parallel Group 3-4 in Pattern 2, Exps 3-4 in ACS B and R visit (09)	900 Secs (2700 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[2]
	4	ANY	WFC3/UVIS, ACCUM, UVIS-CENTER	F814W			Pattern 2, Exps 3-4 in ACS B and R visit (09) (2) Prime + Parallel Group 3-4 in Pattern 2, Exps 3-4 in ACS B and R visit (09)	950 Secs (2850 Secs) [==>(Pattern 1)] [==>950.0 Secs (Pattern 2)] [==>950.0 Secs (Pattern 3)]	[2]
	5	(8) NGC6946-ACS8	ACS/WFC, ACCUM, WFC	F606W			Pattern 2, Exps 5-6 in ACS B and R visit (09) (2) Prime + Parallel Group 5-6 in Pattern 2, Exps 5-6 in ACS B and R visit (09)	900 Secs (2700 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[3]
	6	ANY	WFC3/UVIS, ACCUM, UVIS-CENTER	F606W			Pattern 2, Exps 5-6 in ACS B and R visit (09) (2) Prime + Parallel Group 5-6 in Pattern 2, Exps 5-6 in ACS B and R visit (09)	950 Secs (2850 Secs) [==>(Pattern 1)] [==>950.0 Secs (Pattern 2)] [==>950.0 Secs (Pattern 3)]	[3]
	7	(8) NGC6946-ACS8	ACS/WFC, ACCUM, WFC	F435W			Pattern 2, Exps 7-8 in ACS B and R visit (09) (2) Prime + Parallel Group 7-8 in Pattern 2, Exps 7-8 in ACS B and R visit (09)	900 Secs (2700 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[4]
	8	ANY	WFC3/UVIS, ACCUM, UVIS-CENTER	F814W			Pattern 2, Exps 7-8 in ACS B and R visit (09) (2) Prime + Parallel Group 7-8 in Pattern 2, Exps 7-8 in ACS B and R visit (09)	950 Secs (2850 Secs) [==>(Pattern 1)] [==>950.0 Secs (Pattern 2)] [==>950.0 Secs (Pattern 3)]	[4]



Orbit 3

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Orbit 4

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